

LXXVII.—The "Cirripede" *Lepidocoleus* in the Upper Ordovician Rocks of Scotland. By THOMAS H. WITHERS, F.G.S.

[Plate X. figs. 1-5.]

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THE acquisition by the Geological Department of the British Museum of the well-known collection of Mrs. Robt. Gray, of Edinburgh, has brought to notice certain small fossils, which were included with the Annelida, since they are the specimens which Dr. Cowper Reed (1908, p. 295, pl. xii. figs. 9, 10) described and figured as an Annelidan Tube (?), allied to *Cornulites* and *Conchicolites*.

Examination of these specimens shows, without any doubt, that they represent a species of the genus *Lepidocoleus*, a form which is generally accepted as belonging to the Cirripedia.

The genus *Lepidocoleus* is known by several species (Withers, 1915, pp. 121-2) from the Ordovician, Silurian, and Devonian rocks of Europe and North America, but so far it has not been recorded, as such, from the Palaeozoic rocks of this country. We now have, however, the present specimens from the Ordovician of Scotland, and the genus is represented in the English Silurian by species occurring in the Wenlock beds of Dudley and Malvern.

#### Genus LEPIDOCOLEUS, Faber.

The shell of this genus is composed of two columns of plates, square to oblong in shape, and these combine to form a blade-shaped shell, which opens along the sharp "free" margin, and along the broad "fixed" margin there is a narrow median groove formed between the incurved and rounded margins of the plates; at the apex the shell tapers to a point, and although it also tapers slightly towards the base, it is there somewhat broadly rounded; the plates overlap each other from behind forwards, sometimes to as much as half their length. In some species the plates of each column alternate with each other to some extent, but in others there is a little or no alternation. The umbo of each plate is apical and is situated on the outer edge of the median groove at the "fixed" margin, and there each plate is rather abruptly deflected inwards, but in the plates of the left-hand series this deflected portion is slightly wider, and bent outwards

slightly near the inner margin, to fit under the inturned margins of the plates of the right-hand series, thus forming a kind of hinge (see Pl. X. fig. 4). In consequence of the tapering of the shell at each extremity, the plates vary somewhat in shape according to their position in the shell, but there is also much difference in the shape of the plates, their number, and ornament, in the different species. On the inner surface of each plate of the two columns, near the middle, there is a well-marked sub-circular muscle-scar.

*Genotype*.—*L. jamesi* (Hall & Whitfield).

*Lepidocolæus grayæ*, sp. n. (Pl. X. figs. 1-5.)

1908. Annelidan Tube (?), Cowper Reed, Geol. Mag. dec. v. vol. v. p. 295, pl. xii. figs. 9, 10.

*Diagnosis*.—A *Lepidocolæus* with more than 16 plates in a column, a length of more than 25 mm., and a breadth of 5 mm.; plates overlapping to almost half their length, mostly about twice as wide as long, with an ornament of comparatively wide-spaced growth-ridges, about four to a millimetre, and of five to six very slightly finer ridges between each main ridge, giving the surface, where well-preserved, an exceedingly closely and regularly ridged appearance.

*Horizon and locality*.—Upper Ordovician, Lower Ardmillan series, Drummuck group, Mudstones: Thraive Glen, Girvan, Ayrshire.

*Collection*.—Geological Department of the British Museum (Mrs. Robt. Gray Coll.), registered In. 21648 and In. 21649.

*Holotype*.—The specimen (In. 21648) figured, Pl. X. figs. 1-4, which is presumably the specimen partly figured by Cowper Reed (1908, figs. 9, 10).

*Material*.—Two incomplete shells with the plates very little displaced.

*Description*.—One specimen (Pl. X. fig. 5) represents a shell, including the basal extremity; its length is 20.4 mm., and its greatest breadth 5.0 mm. This shell is bent or humped, with the result that the plates are somewhat telescoped and displaced; the shell-layer of the plates has been removed in places, so that only the impression remains. At least sixteen plates or their impressions can be counted in serial order, but, owing to the bad preservation, the form of the plate at the base cannot be made out, although the rounded shiny impression on the matrix leaves no doubt that this really is the rounded basal extremity. Both this

and the second shell show certain narrow longitudinal depressions, but these are evidently due to compression.

Another specimen (Pl. X. figs. 1-4) was in two pieces, which fitted together quite readily. The larger piece shows a column of eight plates and an impression of another plate, and this is presumably the specimen represented by Cowper Reed (1908, pl. xii. fig. 9) in an inverted position, although it is not easily recognised from the figure. The smaller piece, which consists of two columns, each of four plates, is evidently the third specimen mentioned by Cowper Reed. These two pieces, then, together comprise twelve plates and an impression of another in serial order, and these plates do not appear to have been displaced in any way, so the length of the shell, which measures 21.7 mm., is probably the correct length of the piece preserved, and its greatest breadth is 5.0 mm. On the other side of the shell the lowermost four plates are shown, but since they are much flattened, they do not show well on the broad "fixed" margin; but above these, in the middle of the specimen (Pl. X. fig. 2), the plates of the two series are seen to be in close apposition with little or no alternation. On this same side of the specimen, the lowermost three plates are broken away towards the narrow "free" margin, and, since the fourth plate is entire, one can measure the degree of overlap. The fourth plate has a breadth of 4.7 mm., and a length of 2.7 mm., and the third plate overlaps this to the extent of 1.2 mm., leaving 1.5 mm. exposed. The ornament of the plates consists of fine growth-ridges comparatively wide-spaced, numbering about four to a millimetre, and between these are from five to six slightly finer ridges, which give to the shell a peculiarly closely and regularly ridged appearance. Although the main ridges are clearly seen on both specimens, the finer ridges are well preserved only on this one, where they are very clearly shown on the lowermost four plates of the right-hand series; an enlarged view is given of the two lowest plates (Pl. X. fig. 3).

*Comparison with other species.*—*L. grayæ* is distinguished from other species by its exceedingly fine and numerous growth-ridges, but it would appear to differ also from the known Ordovician and Silurian species in the length of the shell and the number of plates. *L. grayæ* has at least sixteen plates to an incomplete shell, which would have measured at least 25 mm. *L. jamesi* (Hall & Whitfield), from the Hudson River Group (Ordovician) of Cincinnati, is said to have only fifteen plates in a complete shell, and this has only a length of about 12 mm., less than half

the length of *L. grayæ*. *L. sarlei*, J. M. Clarke, from the Niagara Shales (Silurian) of Rochester, New York, has thirteen plates to a complete shell, but this measures as much as 23 mm. *L. grayæ* would seem to be more nearly related to *L. squamatulus* (Barrande), from the Ordovician of Bohemia, and *L. suecicus*, Moberg, from the Upper Ordovician of Sweden—two species that appear to be very close indeed to each other. No shell approaching completeness is known of the two latter species, although a number of plates of *L. suecicus* have been found in association, but the plates would appear to be in many instances longer in proportion to their breadth than is the case in *L. grayæ*, and the growth-ridges number from 8–9 to a millimetre, but with no intervening and almost equally prominent ridges as in *L. grayæ*.

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LXXVIII. — *An exceptionally complete Example of the Cirripede Scalpellum fossula, Darwin.* By THOMAS H. WITHERS, F.G.S.

[Plate X. fig. 6.]

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SOME years ago (1911, Geol. Mag. dec. v. vol. viii. p. 21), when describing certain Cirripedes in the collection of Dr. H. P. Blackmore, F.G.S., I mentioned that he had a beautiful example of the species *Scalpellum (Arcoscalpellum) fossula*, well worthy of description. Owing to its fragile nature, however, it was dangerous to risk sending this important fossil through the post, but since Dr. Blackmore has recently very generously presented it to the Geological Department of the British Museum (Registered In. 21559), it is now possible to proceed with its description and illustration.

While detached valves of this species are fairly common in the Upper Senonian, it is quite exceptional to find the valves in their natural association. Darwin (1851, Pal. Soc. Monogr. Foss. Lepadidæ, p. 24) described two specimens from the Chalk (*Belemnitella mucronata*-zone) of Norwich, each with four valves in position, one specimen consisting of the carina, scutum, tergum, and upper latus, and the other of a carina, scutum, tergum, and carinal latus. Dr. Blackmore's example from the Chalk (*Actinocamax quadratus*-zone) of East Harnham, near Salisbury, Wilts, consisting as it does of fourteen valves in the capitulum, together with some of the plates of the peduncle, is by far